

CLAIMS

Having thus described the aforementioned invention, we claim:

1. An apparatus for sensing an occupant in a vehicle, said apparatus comprising:

a seat defining a first zone;

a first sensor, said first sensor including:

a first member;

a connecting member attached to said first member;

a potentiometer including:

a shuttle attached to said connecting member,

a wiper attached to said shuttle,

a resistive member in electrical contact with said wiper, said shuttle moving relative to said resistive member in response to a deflection of said seat in said first zone,

a first electrical connection to said wiper, and

at least one second electrical connection to said resistive member, a resistance between said first electrical connection and said at least one second electrical connection varying with said deflection;

a processor in electrical communication with said first sensor, said processor programmed to execute a process for determining at least one of a weight and a presence of the occupant; and

a vehicle occupant restraint system in communication with said processor, said vehicle occupant restraint system controlled by said processor.

2. The apparatus of Claim 1 wherein said potentiometer further includes a spring forcing said shuttle to a neutral position.

3. The apparatus of Claim 1 wherein one of said first member and a potentiometer body is attached to said seat.

4. The apparatus of Claim 1 wherein one of said first member and a potentiometer body is in contact with a surface selected from the group consisting of a sitting portion of said seat, a back support of said seat, and a headrest of said seat.

5. The apparatus of Claim 1 wherein a linear movement of said first member is transferred to a linear movement of said shuttle.

6. The apparatus of Claim 1 wherein said connecting member is a flexible shaft housed in a sheath whereby a linear movement of said first member is transferred to a linear movement of said shuttle.

7. The apparatus of Claim 1 wherein a linear movement of said first member is transferred to a rotary movement of said shuttle.

8. The apparatus of Claim 1 wherein said vehicle occupant restraint system includes an air bag system.

9. The apparatus of Claim 1 further including a second sensor associated with a second zone defined on said seat.

10. The apparatus of Claim 1 further including a second sensor associated with a second zone defined on said seat, said processor programmed to execute a process for determining a seated location of the occupant.

11. An apparatus for sensing an occupant in a vehicle, said apparatus comprising:

a seat defining a plurality of zones;

a plurality of first sensors, each said first sensor including:

a first member;

a connecting member attached to said first member;

a potentiometer including:

a shuttle attached to said connecting member;

a wiper attached to said shuttle;

a resistive member in electrical contact with said wiper, said shuttle moving relative to said resistive member in response to a deflection of said seat in a corresponding one of said plurality of zones;

a first electrical connection from said wiper; and

at least one second electrical connection from said resistive member, a resistance between said first electrical connection and said at least one second electrical connection varying with said deflection;

a processor in electrical communication with said plurality of first sensors, said processor programmed to execute a process for determining at least one of a weight, presence, and a seated location of the occupant; and

a vehicle occupant restraint system in communication with said processor, said vehicle occupant restraint system controlled by said processor.

12. The apparatus of Claim 11 wherein said potentiometer further includes a spring forcing said shuttle to a neutral position.

13. The apparatus of Claim 11 wherein one of said first member and a potentiometer body is attached to said seat.

14. The apparatus of Claim 11 wherein one of said first member and a potentiometer body is in contact with a surface selected from the group consisting of a sitting portion of said seat, a back support of said seat, and a headrest of said seat.

15. The apparatus of Claim 11 wherein a linear movement of said first member is transferred to a linear movement of said shuttle.

16. The apparatus of Claim 11 wherein said connecting member is a flexible shaft housed in a sheath whereby a linear movement of said first member is transferred to a linear movement of said shuttle.

17. The apparatus of Claim 11 wherein a linear movement of said first member is transferred to a rotary movement of said shuttle.

18. The apparatus of Claim 11 wherein said vehicle occupant restraint system includes an air bag system.

19. An apparatus for sensing an occupant in a vehicle, said apparatus comprising:

a seat having a plurality of first zones defined on a sitting portion;

a plurality of first sensors, each said first sensor including:

a first member;

a first connecting member attached to said first member;

a second connecting member engaging said first member;

a potentiometer attached to said second connecting member, said potentiometer being a rotary potentiometer and including:

a wiper attached to said second connecting member;

a resistive member in electrical contact with said wiper, said second connecting member rotating in response to a deflection of said seat;

a first electrical connection from said wiper; and

at least one second electrical connection from said resistive strip, said resistance between said first electrical connection and said at least one second electrical connection varies with said deflection;

a processor in electrical communication with said plurality of first sensors, said processor programmed to execute a process for determining at least one of a weight, presence, and a seated location of the occupant; and

a vehicle occupant restraint system in communication with said processor, said vehicle occupant restraint system controlled by said processor.

20. The apparatus of Claim 19 wherein said seat has a surface that deflects in response to a weight of said occupant.

21. The apparatus of Claim 19 wherein said seat has a plurality of second zones defined on a back support of said seat, said plurality of second zones having a plurality of second sensors attached to a seat back frame behind said back support; and wherein at least one of said plurality of second sensors has said first member in a corresponding one of said plurality of second zones.

22. The apparatus of Claim 19 wherein said seat has a plurality of second zones defined on a headrest of said seat, said plurality of second zones having a plurality of second sensors attached to a seat headrest frame behind said headrest;

and wherein at least one of said plurality of second sensors has said first member in a corresponding one of said plurality of second zones.

23. The apparatus of Claim 19 wherein said member has a flat surface normal to said first connecting member's direction of movement, said flat surface in contact with said sitting portion of said seat when said seat deflects.

24. An apparatus for sensing an occupant in a vehicle, said apparatus comprising:

a seat having a plurality of zones defined on a sitting portion;

a plurality of sensors, each of said plurality of sensors actuated by a corresponding one of a plurality of first members, said plurality of first members responsive to a deflection of said sitting portion in a corresponding one of said plurality of zones, each of said plurality of sensors including a corresponding one of a plurality of potentiometers, a deflection of each one of said plurality of first members causes a corresponding one of said plurality of potentiometers to have a resistance value;

a processor in electrical communication with said plurality of sensors, said processor programmed to execute a process for determining the presence of the occupant in said seat; and

an occupant restraint system in communication with said processor, said occupant restraint system controlled by said processor.

25. The apparatus of Claim 24 further including a plurality of connecting members, each connecting member attached to said first member and operating a shuttle in said potentiometer, said shuttle moving a wiper along a resistive member, said wiper having an electrical connection in communication with said processor.

26. The apparatus of Claim 24 wherein each of said plurality of first members is attached to a shaft of a corresponding one of said plurality of potentiometers, each of said plurality of potentiometers having a resistance that varies with rotary movement of said shaft.

27. The apparatus of Claim 24 wherein said processor is programmed to execute a process for determining at least one of a weight and a seated location of the occupant in said seat.

28. The apparatus of Claim 24 wherein said processor is programmed to execute a process for determining a weight whereby said process includes at least one of using a lookup table and calculating said weight from said plurality of sensors,

29. The apparatus of Claim 24 wherein said plurality of zones includes at least two zones providing front to back sitting location of the occupant on said seat.

30. The apparatus of Claim 24 wherein said plurality of zones includes at least two zones providing left to right sitting location of the occupant on said seat.

31. An apparatus for sensing an occupant in a vehicle, said apparatus comprising:

a seat having a sitting portion;

a plurality of sensors, each one of said plurality of sensors including:

a first member responsive to a deflection of said sitting portion,

a first connecting member attached to said first member,

a potentiometer actuated by said first connecting member;

a processor in electrical communication with said plurality of sensors, said processor programmed to execute a process for determining the presence of the occupant in said seat; and

an occupant restraint system in communication with said processor, said occupant restraint system controlled by said processor.

32. The apparatus of Claim 31 wherein said first connecting member operates a shuttle in said potentiometer, said shuttle moving a wiper along a resistive member, said wiper having an electrical connection in communication with said processor.

33. The apparatus of Claim 31 whereby said first connecting member engages a second connecting member attached to said potentiometer, said second connecting member rotating in response to said first connecting member moving linearly.

34. The apparatus of Claim 31 wherein said processor is programmed to execute a process for determining at least one of a weight and a seated location of the occupant in said seat.

35. A sensor for detecting an occupant seated in a vehicle, said sensor comprising:

a first member;

a connecting member engaging said first member;

a potentiometer including:

a body, said first member moving linearly in relation to said body;

a shuttle attached to said connecting member;

a wiper attached to said shuttle;

a resistive member in electrical contact with said wiper, said shuttle moving relative to said resistive member in response to a deflection of said seat;

a first electrical connection from said wiper; and

at least one second electrical connection from said resistive member, a resistance between said first electrical connection and said at least one second electrical connection varying with said deflection.

36. The sensor of Claim 35 wherein said first member is in contact with a surface selected from the group consisting of a sitting portion of said seat, a back support of said seat, and a headrest of said seat.

37. The sensor of Claim 35 wherein said potentiometer body is attached to a surface selected from the group consisting of a sitting portion of said seat, a back support of said seat, and a headrest of said seat.

38. The sensor of Claim 35 wherein a linear movement of said first member is transferred to a linear movement of said shuttle.

39. The sensor of Claim 35 wherein said connecting member is a flexible shaft housed in a sheath whereby a linear movement of said first member is transferred to a linear movement of said shuttle.

40. The sensor of Claim 35 wherein a linear movement of said first member is transferred to a rotary movement of said connecting member and said shuttle.

41. An apparatus for sensing an occupant in a vehicle, said apparatus comprising:

a means for sensing a deflection of a seat surface;

a means for varying a resistance based on said deflection; and
a means for controlling an air bag system based on said resistance.